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Incidence of Bovine Tuberculosis in Cross River State: A Retrospective Abattoir Study

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ABSTRACT

Abattoir records base on typical tuberculosis lesions for ten year (1991-20000) were collated and analyzed to determine the incidence of bovine tuberculosis in cattle slaughtered in three main abattoirs (Ogoja, Ikom and Bakoko) in the Northern, central and Southern senatorial zones of Cross River State. Out of the 66,680 cattle slaughtered within the ten-year period, 1,497 representing 2.25% (23/1000/year) were found to have tuberculosis lesions. Tuberculosis lesions were observed at a higher proportion in the dry season 2.7% (27/1000/year) than in rainy season 2.0% (20/1000/year). The lesions were also observed more in the female (53.8%) animals than in the males (46.2%). The lungs were the most affected organ with 68.8% of cases while the oesophages was the least affected organ with 1.3% of the cases. In terms of geographical distribution Ogoja abattoir in the Northern zone recorded the highest incidence (38/1000/yr) while Bakoko (Southern zone) recorded the least (12/1000/yr); the incidence rate in the Northern zone was three times (3-fold) that of the southern zone. Bovine tuberculosis in Cross River State is relatively high and could constitutes a public health hazard. Routine surveillance through meat inspection by professionals is recommended intervention programme.

Key words: Tuberculosis, slaughter cattle, Cross River State, Nigeria

INTRODUCTION

Tuberculosis is a chronic slowly progressive wasting disease, which affects both man and animals and is caused by the tubercle bacilli, Mycobacterium species. Inc cattle, man and birds the disease is caused by *Mycobacterium bovis*, *M. tuberculosis* and *M. avium*, respectively (Blood and Radiostits, 1989). In addition to these three, M leprae is among the four most pathogenic species often referred to as tubercle bacilli (Ayanwale, 1988).

Tuberculosis is characterized by progressive development of tubercle in any of the organs, in most species adscess formation with resultant caseation and calcification; cachexiation and high fatality (Blood and Radostils, 1989).

Although there is surge of human tuberculosis in developed countries, the incidence of bovine tuberculosis in man is now low in these countries, due to programmed eradication and control programmes (Cook, 19960. These programmes include thorough professional meat inspection, milk pasteurization and stamping out policy among others (Kleebery, 1984). Pritchard, (1988) and WHO, (1994) observed that the transmission of *M. bovis* to man is mainly through inhalation and consumption of infected meat and milk products. The disease remains endemic in parts of Nigeria, with varying prevalence rates (Olukunle 2002, Cadmus, 2003 and Adekoya et al., 2003).

The concern for bovine tuberculosis in Cross river State is because the state is becoming a livestock (Cattle and Goats) endowed area taking into consideration the establishment of more livestock farms and the reactivation of the Obudu cattle ranch. In fact there had been an increase in livestock farming. Consequently, there exists a close relationship between families and their livestock to the extent that there is co-habitation with livestock in their households. The consumption rate of meat in the state has greatly increased. These factors have increased the exposure risk to zoonotic infections. Since *M. bovis* is transmitted through ingestion and inhalation, livestock related workers such as butchers and other abattoir workers, milkers, milk sellers and veterinary personnel are among the population at risk. Inadequate meat inspection, eating of improperly cooked meat, drinking of fresh and inadequately heat-treated milk and milk products, and free mixing of apparently healthy and sick individuals are also factors that will provide an enabling environment for the spread of zoonotic diseases especially bovine tuberculosis (Garba, 2002).

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There is inadequate documentation in Nigeria on the incidence of tuberculosis especially the prevalence of the various types/species of the causative organism (Daborn and Kazwala, 1997). It is against this background of poor surveillance and inadequate reporting, that a retrospective study of tuberculosis in slaughtered cattle at the three main abattoirs in Cross River State was carried out, as a preliminary phase of epidemiological studies of tuberculosis in Cross River State.

MATERIALS AND METHODS

The three major abattoir namely Ogoja, Ikom and Bakoko (Calabar) in each of the three senatorial zones of Cross River State were investigated for cases of tuberculosis using official meat inspection records documented from 1991 to 2000. The inspection was routinely carried out by qualified veterinary officers posted by the state government. Identification of cases was based on presence of typical tubercles, granulomatous and caseated lesions in lungs, liver, lymphnodes, etc. oftentimes, when tuberculosis lesions were grossly detected, acid fast technique was carried out to identify the tubercle bacilli. The data collated from the three zones were analyzed for geographical, sex, seasonal, and organ distribution. Chi square analysis was carried out to determine the association between tuberculosis and variables such as sex and seasonal incidence. Chi square was also used to test the level of significance of the differences in incidence (Steel and Torric, 1980).

RESULTS

Between the year 1991 to 2000, a total of 66,680 cattle were slaughtered in the three abattoirs. One thousand four hundred and ninety seven (2.25%) were positive for bovine tuberculosis. The incidence rate of bovine tuberculosis during the period 1991-1995 is 19/1000 slaughtered cattle/year. During the next 5 years (1996-2000) the incidence rate has risen to 25/1000/year (Table 1). This means a 31.6% increase in incidence rate of bovine tuberculosis in the last 5 years. Lesion of bovine tuberculosis were observed at a higher proportion in the dry season 2.7% (27/1000 slaughtered cattle/year) than in the rainy season 2.0% (20/1000/year) Table 2. A greater proportion (53.8%) of cases were observed in the females than in the males (46.2%). The sex distribution of cases is shown in (Table 3).

The frequency of occurrence of the lesions in various organs showed that the lung had 1030 (0.69 or 69%), liver 298 (0.2 or 20%), lymphnode 72 (0.05 or 5%), intestine 42 (0.03 or 3%), spleen 35 (0.02 or 2%) and Oesophagus 20 (0.10 or 1%) of the 1,507 cases (Table 4). There is a strong association between tuberculosis and season (x^2 = 36.35, df = 1,$p < 0.5$) and between tuberculosis and sex of cattle (x^2 = 5,95, df = 1, $p < 0.05$).

DISCUSSION

The average incidence rate of bovine tuberculosis from the data analyzed was 21/1000/yr out of the 1497 cases recorded among the 66,680 cattle slaughtered between the period of 1991-2000. Comparatively, at Maiduguri abattoirs 56 out of 2,640 carcasses examined had tuberculosis representing 21/1000/yr cattle slaughtered (Northern Nigeria Annual Report of Ministry of Agriculture and Forestry Resources, 19760. Ajogi et al (1995) and Sofanda and Garba (2000), in Sokoto found an incidence rate of 5/1000/yr and 7/1000/yr respectively in cattle. In the present study, the average incidence of bovine tuberculosis for the three abattoirs is 21/1000/yr. This result is also corroborated by other previous reports on bovine tuberculosis in Nigeria abattoirs, which include 1.44% (Cadmus et al., 1999), 0.69% (Akingbade 2002 and 6.7% (Cadmus 2003). The incidence rate in the Northern zone (Ogoja) is three times that of the South (Bakoko). The low incidence rate of bovine tuberculosis in Bakoko abattoir (Calabar) and comparatively high incidence in Ogoja and Ikom seems to be related to the social and economic status of the areas. Much healthier and well fed castrated male cattle were slaughtered in Bakoko where the people that control the economy of the state live than in Ogoja and Ikom where more cachexic female cattle were slaughtered due to low income of the rural populace. Secondly, there are many and more qualified veterinary officers in the State Capital than in any other local government area to carry out routine thorough inspection of meat and meat products. Incidence of bovine tuberculosis was higher in the dry season 27/1000/yr than in the raining season 20/1000/yr (Table 2). This could be due to movement of animals in search of food and water (Cook, 1996). With respect to sex, the female cattle were more infected than the males, this could be due to the fact that they stay longer in the herd for purpose of reproduction than the male cattle.

From the result, pulmonary tuberculosis with a prevalence of 68.8% was more common probably because of the rapid spread of this form of the disease and because transmission in the herd is primarily by inhalation. Bovine tuberculosis is a zoonotic disease of public health significance that requires global attention. The obvious implication of the high incidence recorded in the study is the potential rate of exposure for cattle herders, butchers, abattoir workers, veterinary workers and meat consumers in the state. Though bovine tuberculosis infects man, man to man transmission is rare, but there are reports of transmission from an to cattle (Cook, 1996; Michalak *et al.,*

Table 1. Retrospective study of incidence of bovine tuberculosis in Cross River State abattoirs, Nigeria (1991 - 2000)

Year	Ogoja			Ikom			Bakoko (Calabar)			Total		
	No. of cattle slaughtered	No. of TB cases	Incidence rate	No. of cattle slaughtered	No. of TB cases	Incidence rate	No. of cattle slaughtered	No. of TB cases	Incidence rate	No. of cattle slaughtered	No. of TB cases	Incidence rate
1991	1104	28	25.4	2397	38	15.8	1809	18	10.0	5310	84	15.8
1992	1300	45	34.6	2393	65	27.6	1939	25	12.9	5632	135	24.0
1993	1756	29	16.5	2522	40	15.9	1919	18	9.4	6197	87	14.0
1994	1220	30	24.6	2548	42	16.5	1967	18	9.2	5735	90	15.7
1995	1243	48	38.6	2480	72	29.0	2027	24	11.8	5750	144	25.0
1996	1279	51	39.9	2578	77	29.9	2044	25	12.2	5901	153	25.9
1997	1256	62	49.4	4754	93	19.6	2250	31	13.8	8260	186	22.5
1998	1276	77	60.3	3686	117	31.7	2433	37	15.2	7395	231	31.2
1999	1285	65	50.6	3758	94	25.0	2756	36	13.1	7799	195	25.0
2000	1752	64	36.5	4053	101	24.9	2896	27	9.3	8701	192	22.1
Total	13,471	499	376.4	31,169	739	235.9	22,040	259	116.9	66,680	1497	212.4
Average	1347.1	49.9	37.6	3116.9	73.9	23.6	2204.0	25.9	11.7	6668.0	149.7	21.2
Incidence rate			38/1000/yr			24/1000/yr			12/1000/yr			21/1000/yr

1998). Recently, the increase in infection of tuberculosis associated with HIV may suggest an increase in bovine tuberculosis in human (Kitching, 1993). It has been reported that about 90% of the human population of Africa are exposed to tuberculosis from this retrospective study, there is the need for public health education of the population at risk. Government at all levels should enforced the legal protection given to veterinarians and meat inspectors in threats and litigation arising from condemnation of infected organs and

or carcasses.

Table 2. Seasonal incidence (trend) of bovine tuberculosis in Cross River State abattoirs (1991 – 2000).

A	Months (raining season)	Total animal slaughtered	No. of TB cases	Incidence rate
1	April	5450	105	19.3
2	May	5503	123	22.2
3	June	5589	114	20.4
4	July	5570	111	19.9
5	August	5467	81	14.8
6	September	5753	99	17.2
7	October	5639	129	22.9
	Total	38,971	762	136.7
	Average	5553.7	105.5	20/1000/yr

B	Dry season	Total animal slaughtered	No. of TB cases	Incidence rate
8	November	5738	129	22.5
9	December	6168	159	25.8
10	January	5412	138	25.5
11	February	5120	141	27.5
12	March	5271	168	31.9
	Total	27,709	735	133.2
	Average	5,558	144	27/1000/yr
	Total	66,680	1497	

Table 3. Sex distribution of cattle slaughtered in Cross River State abattoirs (1991 - 2000)

S/No	Abattoir	Total females slaughtered	Number of female with gross lesions (%)	Total male slaughtered	Number of male with gross lesions (%)
1	Ogoja	7,955	294(3.70)	5,516	205(3.72)
2	Ikom	19,226	456(2.37)	11,943	283(2.37)
3	Bakoko	8,696	102(1.17)	13,344	157(1.18)
	Total	35,877	852(2.37)	30,803	645(2.09)

Table 4. Organ distribution of tuberculosis lesion observed in cattle in Cross River State abattoirs (1991 – 2000).

S/No	Organs	Total	Male	Female	Frequency distribution
1	Lungs	1040	321	719	0.69
2	Liver	298	99	199	0.20
3	Lymphnodes	72	22	50	0.05
4	Intestine	42	11	31	0.03
5	Spleen	35	17	18	0.02
6	Oesophages	20	11	9	0.01
		1507	481	1026	1.00

REFERENCES

Adekoya, C. J., Ojo, O. A. and Uja, P. C. (2003). Bovine tuberculosis in Ogun and Oyo States of Nigeria. *J. Anim. Prod.*.36, 73-75.

Ajoga, I, Uko, U. E and Tahir, F. A (1995). Retropespective (1990-1992). Study of tuberculosis cysticercosis and hydatiodosis in food animals slaughtered in Sokoto Abattoir, Nigeria. *Trop. Vet*. 13(3/4), 1-4.

Ayanwale, F. O. (1988). Emerging zoonoses in Africa II. Non-tuberculosis mycobacterial pathogen of man. *Trop. Vet*. 6, 33-88.

Blood, D. C. and Radostits, J. A. (1989). *Veterinary Medicine*: *Textbook of Disease of Cattle , Sheep, Pigs, Goats and Horses*, 7th ed. ELBS Bailliere Tindall. London pp 524-542.

Cadmus, S. I. B (2003). Tuberculosis in food animals. *Nig. Vet. J.* 24(3), 72-75.

Cook, A. J. C. (1996). Human and bovine tuberculosis in the Monze District of Zambia – A cross-sectional study. *Br. Vet. J.* 152(1), 37-45.

Daborn, C. J., Kazwala, R. R. (1997). The bovine tuberculosis cycle an Africa perspective. *J. Appl. Bact*. 81, 27-32.

Garba, H. S. (2002). Epidemiological studies of tuberculosis in Sokoto State. Tuberculosis in livestock and man. Unpublished Ph. D. Thesis, Usmanu Danfodiyo University, Sokoto, Nigeria

Kitching, R. P. (1993). Guest Editorial. Tuberculosis and AIDS A deadly Combination . *Br. Vet. J.* 149, 184-186.

Kleebery, H. H. (1984). Tuberculosis of Bovine Origin in Relation to Public Health. Revenue Sci.

Michalak, K., Augustine C., Diesel, S., Balan, J. M., Zimaerman, P. and Mashow, J. N (1998). Mycobacterium tuberculosis. Infection as a zoonotic disease. Transmission between human and elephants. *Emerging Infect. Dis.* 4(2), 56-60.

Olukunle, C. (2002). Prevalence of Bovine tuberculosis Ibadan, Oyo State. *J. Agric. Sci. Technol.* 7, 42-43.

Pritchard, D. G. (1988). A century of Bovine Tuberculosis 1888-1988. Conquest and controversy. *J. Comp. Pathol.* 99, 357-399.

Sondafa, M. I. and Garba, H. S. (2000). A restrospective study of bovine tuberculosis in cattle slaughtered in Sokoto abattoir. *Sokoto J. Vet. Sci.* 11, 36-39.

Steel, G. D. and Torrie, J. H. (1980). *Principles and Produce of Statistics. Biomedical Approach,* 2nd ed. McGraw Hill Publ. Inc. New York.

WHO (1994). Zoonotic tuberculosis. *Mycobacterium bovis*. Memorandum from a WHO Meeting (with the participation of FAO) *Bull WHO*. 72(6), 851-857.